

Neurodiversity: An overview

School resources

Neurodiversity is a term used to describe neurological differences in the human brain. From this perspective, the diverse spectrum of neurological difference is viewed as a range of natural variations in the human brain rather than as a deficit in individuals. The concept of neurodiversity has foundations in neuroscience, with studies of neuroimaging (brain imaging) showing differences between individuals' neural pathways - those who are neurotypical and those with neurodiversity. Put simply, this means that humans' brains are wired differently, and those differences can have a direct impact on an individual's thinking and learning. These differences are often diagnosed as neurological conditions. Neurodiversity is an umbrella term that includes both conditions that are life-long and those that can develop throughout life. This includes acquired illness or brain injury, Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), dyscalculia, dyslexia, dyspraxia, intellectual disability, mental health, and Tourette syndrome.

Where did the concept of neurodiversity come from?

The emergence of the term neurodiversity is linked in the research literature to Judy Singer, an Australian sociologist, who has autism. In the late 1990s, Singer rejected the idea that autism was a disability and instead proposed that autism was a difference in how the human brain works and a representation of neurological diversity. The term was quickly adopted by the wider disability community, with the term neurotypical being used to represent typical neurological patterns and neurodiversity to represent neurological differences.

Forms of neurodiversity

Neurological conditions encompassed by the term neurodiversity fall into three categories: applied neurodiversity, clinical neurodiversity, and acquired neurodiversity. It is important to remember, however, that over the period of an individual's life they may experience multiple conditions that result in an overlap between these three categories.

Applied neurodiversity

This includes conditions with which an individual is born, and which are not considered to be a health condition. Applied neurodiversity refers to difficulties in the application of skills such as gross motor control, number concepts, and reading. Conditions that can be classified as applied neurodiversity along with their characteristics are shown in Table 1.

CONDITION	CHARACTERISTICS
Dyscalculia	Dyscalculia can lead to difficulties in understanding numbers and applying number concepts and calculation.
Dyslexia	Dyslexia affects language processing in the brain and can lead to difficulty with reading, writing, and ordering speech.
Dyspraxia	Dyspraxia is a developmental condition that can affect the processes involved in an individual's planning and execution of movement. Dyspraxia can also affect an individual's intellectual, physical, social and emotional, and sensory development.

Table 1: Applied neurodiverse conditions

Clinical neurodiversity

This includes neurological differences with which an individual is born, and which are considered to be health conditions. Clinical neurodiversity relates to difficulties in communication, social skills, behaviour, and impulse control. Conditions that can be classified as clinical neurodiversity along with their characteristics are shown in Table 2.

CONDITION	CHARACTERISTICS
Attention deficit hyperactivity disorder (ADHD)	ADHD is a developmental condition that has 3 sub-groups: hyperactive ADHD, impulsive ADHD, and inattentive ADHD. Individuals may experience effects that predominantly fall within one category or a combination of categories. ADHD can affect an individual's attention span, impulse control, mood regulation, and ability to sit still.
Autism	Autism is a developmental condition that can affect an individual's communication, social interaction, impulse control, interest levels, and sensory regulation. Autism is a spectrum condition so the severity and specific effects can vary greatly for each individual.
Intellectual disability	Intellectual disability is a developmental condition that can impact the development of an individual's cognitive function and adaptive behaviour skills. These two things can affect thinking, learning, problem solving and reasoning.
Tourette Syndrome	Tourette Syndrome is a condition that affects an individual's nervous system. Common characteristics of Tourette Syndrome include uncontrollable and repetitive movements and vocalisations.

Table 2: Clinical neurodiverse conditions

Acquired neurodiversity

Includes neurological differences that can develop as part of a health condition or injury.

Acquired neurodiversity relates to conditions that can be resolved as an illness or injury heals, as well as conditions that can worsen as an individual's health deteriorates.

Conditions that can be classified as acquired neurodiversity along with their characteristics are shown in Table 3.

CONDITION	CHARACTERISTICS
Acquired brain injury	Acquired brain injury is damage to the brain that is caused by an accident or event. This condition can affect a person's memory, personal organisation, communication skills and their ability to concentrate.
Illness	Illnesses themselves, along with the treatment of some illnesses, can result in either permanent, degenerative, or temporary neurological conditions. For example, stroke, Parkinson's Disease, Chronic Fatigue Syndrome, and some cancer treatments can all affect an individual's neural system and lead to an illness-related neurological condition.
Mental health	Under the neurodiversity umbrella, mental health refers to conditions that can affect cognition such as anxiety, depression, and obsessive compulsive disorder. These conditions can occur for a number of reasons including trauma, the side effects of medication, exposure to certain substances, or as a response to a significant life event. Mental health is considered to be acquired neurodiversity as these conditions can be episodic and have temporary effects on a person's cognition.

Table 3: Acquired neurodiverse conditions

It is important to remember that characteristics of conditions like those listed above will have varying impacts and levels of severity in individuals diagnosed as having those conditions. It is also important to remember that, while an individual may display characteristics of a specific condition, they may not in fact have that condition. Through the neurodiversity model, we can begin to understand how and why an individual may display and experience characteristics that overlap multiple conditions as these conditions are interrelated and all stem from neurological differences.

Variations in terminology

In some of the literature on neurodiversity, what is often referred to elsewhere as Autism Spectrum Disorder (ASD) is instead referred to as Autism Spectrum Condition (ASC). While different in approach, these terms are referring to the same thing. The shift in language is deliberate as it rejects the medical model of diversity that frames human differences as disorders that need to be cured in favour of a more social model of diversity as a natural occurrence. While this aligns with the neurodiversity model, it is not applied universally. For example, Attention Deficit Hyperactivity Disorder includes the words deficit and disorder, neither of which reflect the social model of difference with which neurodiversity is aligned. This terminology is a representation of the pervasive influence of medical models of diversity rather than a representation of the neurodiversity perspective.

A strengths-based model

The concept of neurodiversity represents a strengths-based model which acknowledges that, while some children learn and think differently, these are simply differences and not deficits. The neurodiversity model shifts the focus away from the challenges that a neurodiverse individual may experience to the

strengths that they possess. For example, an individual diagnosed with dyslexia may experience difficulty decoding words and have great visual communication skills.

Designing learning programmes and tasks that allow children to draw on their known strengths can create opportunities for students to access the class curriculum in ways that suit their individual abilities. Using a strengths-based approach is one way to create learning opportunities that allow students to experience success and develop confidence in their abilities while also ensuring that the things that children find challenging do not become barriers to their learning. Designing learning programmes that allow children to access the class curriculum in a number of ways is an approach that can benefit not only neurodiverse learners but all learners.

By highlighting the positives of neurodiversity, the strengths-based approach has the potential to increase awareness and understanding about neurological difference while also reducing social stigma. The positive framing of difference in the neurodiversity model can also assist teachers and schools who may be thinking about how to support neurodiverse students to be successful learners.

Supporting neurodiverse students

One goal of the neurodiversity model is to provide appropriate support for neurodiverse students. When a child has an official diagnosis, support can be tailored to meet their individual learning support needs based on the challenges that diagnosis brings. Some children may never receive an official diagnosis but still present characteristics that align with a neurological condition. Support can still be provided to these students using the strengths-based approach of the neurodiversity model. When a child does not have an official diagnosis and a condition is suspected, it is important to consult with the child's family before seeking further professional advice.

Support within schools

There are many ways that teachers and schools can support neurodiverse students. This may include fostering a school culture that celebrates diversity, providing teachers with professional development on supporting diverse learning needs, and incorporating student voice in decision making processes. In terms of classroom support, teachers should ensure that learning programmes and the learning environment are designed in ways that engage all students. This may include providing content in multiple formats that allow students to access information in a way that suits their learning strengths, and multiple options for how a student may represent their learning.

Additional support

Where additional learning support such as teacher aide support or specialist support like speech language therapy is needed, referrals can be made to the Ministry of Education by contacting a regional service manager. Referrals are generally made by a school's Special Education Needs Coordinator (SENCo). In cases where a school does not have a SENCo, teachers or other senior leaders may make referrals.

While the neurodiversity model focuses on the positives of neurological differences, many requests for additional resourcing and support require the student to have a formal diagnosis of a disability, which can sometimes be a negative experience for students and their families. Schools and teachers may support students and their families through this process by making sure they have the information they need, that they understand the process, and by attending events such as paediatric appointments with students and their families.

Myths and misconceptions

There are a number of myths and misunderstandings associated with neurodiversity and neurodiverse students.

- **Neurodiverse students cannot learn.** All students have the potential to learn. A perceived lack of intelligence and low teacher expectations for neurodiverse students has been linked to student underperformance and poor achievement. While some students may require curriculum adaptation and differentiated teaching instruction, this does not mean they are incapable of learning and succeeding at school.
- **Neurodiversity means changing how we talk about people with neurological conditions.** Neurodiversity is more than just changing the language we use to define neurological conditions. Neurodiversity is a model that challenges society's assumptions about what is normal and how they frame difference. Under this model, it is not the characteristics of neurological conditions but societies themselves that create barriers to the participation, achievement, and success of neurodiverse individuals.
- **Neurological conditions can be cured.** It is possible for some neurological conditions to be resolved over the course of a person's life. For example, some acquired neurological conditions can be temporary or episodic. Other neurological conditions, such as autism, are lifelong. The neurodiversity model seeks to redefine definitions of what is considered normal through framing diversity as natural as opposed to something that requires treatment or cure.
- **It is the teacher's responsibility to make sure neurodiverse students are included in the classroom.** It is everyone's responsibility to make sure all children are included in the classroom. While the teacher is the leader of their classroom, students, other teachers, school leaders, and even parents can contribute to the culture of the learning environment. The teacher plays a key role as both a facilitator and role model for approaches to neurodiversity in the classroom.

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